Docket No.: 60,469-034

AF/2837

9/Appeal Brief Melissa 9/24/02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Zaharia

SERIAL NO.: 09/778,481

FILED: 02/07/2001

EXAMINER: Salata, Jonathan

GROUP ART UNIT: 2837

FOR: ELEVATOR INSPECTION DEVICE ARRANGEMENT

APPEAL BRIEF

Box AF
Assistant Commissioner of Patents & Trademarks
Washington, D.C. 20231

Dear Sir:

A Notice of Appeal in this application was submitted on July 12, 2002. Appellant now submits its brief. The fee of $320.00 for filing this brief should be charged to Deposit Account No. 15-0750 in the name of Otis Elevator Company as stated on the enclosed Authorization to Charge Deposit Account.

Real Party in Interest

Otis Elevator Company is the real party in interest.

Related Appeals and Interferences

There are no related appeals or interferences.

Status of the Claims

Claims 1-16 stand finally rejected under 35 U.S.C. §112, first paragraph, and 35 U.S.C. §103.

Status of Amendments

No amendment has been submitted after final. Claims 1-16 are pending as included in the appendix of claims.

Summary of the Invention

Modern elevator systems include a car or cab 22 that moves through a hoistway 34 between different levels in a building, for example. Typical arrangements include at least one belt[1] 26 that bears the load of the car. At least one sheave 28, 30 guides the rope as the car moves. (Page 1, line 7-11).

It is necessary to inspect the condition of the belt 26 because they tend to wear over time. Belt inspection technologies have been improving, however, there is a need for the ability to enhance the reliability of belt condition determinations and improve the economies associated with belt design, maintenance and replacement. (Page 1, line 14-page 2, line 10).

This invention provides an improvement by positioning a sensor device 40 for inspecting the belt condition in an elevator system such that the portion of the belt that is most likely to wear is inspected by the sensor 40. According to the invention, the portion of the belt 26 that is most likely to wear gets inspected and, therefore, improved belt condition determinations can be made. A variety of factors based upon the particular elevator system configuration affect the belt and provide information regarding which portion of the belt is most likely to wear. The invention includes considering such factors to determine what portion of the belt is most likely to wear and then strategically placing the inspection device

[1] The application uses the terms "rope" or "belt" interchangeably and the claimed arrangement is not limited to one particular type of load bearing assembly.

40 relative to the elevator system components to gather information regarding the portion of the belt that is most likely to experience wear or deterioration over time. (Page 5, lines 3-7).

The types of factors considered in the inventive approach include the number and nature of bends that various sections of the belt 26 experience as the elevator car 22 travels in the hoistway, the diameter or size of the sheaves 28, 30 over which the belt 26 bends, distances between the sheaves, the angle of the belt wrap around the sheaves, and the worst case loading on various sections of the belt. This invention includes utilizing one or more of these factors for determining the ideal placement of the inspection device. (Page 5, lines 3-15).

The various factors that are considered in one example preferably are weighted to give appropriate emphasis to the factors that contribute more significantly to belt fatigue. For example, bends over smaller diameter sheaves and shorter distances between sheaves provides a more significant impact than loading. Similarly, reverse bends provide a higher impact than simple bends. (Page 5, line 19 - page 6, line 6).

The specification describes the use of the inventive approach on five different types of example elevator systems for determining the ideal placement of a sensor 40 monitoring the condition of the portion of the belt that is most likely to wear.

Claim 1 is directed to an elevator system that includes an inspection device that provides information regarding a condition of a portion of the rope that is most likely to wear.

Independent claim 5 recites a method that includes determining a portion of the belt that is most likely to wear and gathering information regarding a condition of that portion of the belt using an inspection device that is positioned relative to the belt.

Independent claim 13 recites considering at least one of five different elevator system variables to determine what portion of the belt is most likely to wear and positioning the inspection device relative to the belt such that the inspection device is capable of gathering wear information regarding the portion that is most likely to wear.

Issues

Whether the final rejection under 35 U.S.C. §112, paragraph 1, is proper when the specification describes the type of variables considered in the inventive approach and provides five different examples of elevator systems in which the inventive approach is utilized to determine the best position to place a belt inspection device.

Whether the final rejection under 35 U.S.C. §103 of claims 1-16 is proper where there is no motivation to make the Examiner's proposed modification and, even if it were made, the result is not the same as Applicant's claimed invention.

Grouping of Claims

The rejection of claims 1-16 under 35 U.S.C. §112 is contested. The rejection of claims 1-16 under 35 U.S.C. §103 is contested.

Claims 2-4 and 12 depend from claim 1. Claims 1 and 2 stand or fall together for purposes for this appeal. Claims 3 stands alone. Claim 4 stands alone. Claim 12 stands alone.

Claims 6-11 depend from claim 5. Claim 6-8 stand or fall together but separately from claim 5. Claim 9 stands alone. Claim 10 stands or falls with claim 5. Claim 11 stands alone.

Claims 14-16 depend from claim 13. Claim 14 stands alone. Claims 15 and 16 stand or fall together.

Arguments

INTRODUCTION

The specification enables the claims according to 35 U.S.C. §112 because the specification describes the types of variables considered when determining what is the ideal placement of an inspection device for monitoring the condition of the rope or belt in an elevator system. Additionally, the specification provides five different examples of different elevator system arrangements where the inventive approach is applied to arrive at a determination for the ideal inspection device location. The Examiner fails to recognize that the various examples provided in the specification are enabling because they provide example implementations of the inventive approach.

The claims are not obvious under 35 U.S.C. §103. Even if the combination were proper, it is not the same as the claimed invention. The proposed combination of a patent with a single statement from the present application does not contemplate monitoring a wear condition of a portion of the rope or belt in an elevator system that is most likely to wear nor positioning the inspection device so that it is capable of examining the portion of the belt that is most likely to wear. Further, there is no *prima facie* case of obviousness because making the substitution suggested by the Examiner would defeat the entire purpose of the primary reference. Accordingly, there is no legally sufficient motivation and the combination cannot be made.

THE CITED REFERENCES

A. United States Patent No. 5,731,528 ("the *Yamazaki* reference")

The *Yamazaki, et al.* reference is directed to an entirely different problem than that which Applicants' invention solves. The *Yamazaki, et al.* reference is directed to a system that measures tension on an elevator rope by detecting traveling waves within the elevator rope when an instantaneous lateral displacement is applied to the rope. The *Yamazaki, et al.* arrangement requires associating a tension measuring device with a rope when the elevator is not moving. There is no discussion whatsoever in the *Yamazaki, et al.* reference for measuring the wear condition of any portion of a rope or belt.

The Examiner mistakenly takes the *Yamazaki, et al.* discussion of wear on an ***elevator sheave*** as a teaching that it somehow relates to monitoring wear on a rope or belt.

B. Applicants' Allegedly Admitted Prior Art

In the Final Office Action, the Examiner quotes page 5, lines 1-2 of Applicants' application, which is a portion that begins on line 19 of page 4. In that paragraph, the specification states that the inspection device 40 preferably utilizes magnetic flux or electrical resistance measurement techniques for determining the condition of the belt. The statement quoted by the Examiner merely recognizes that other types of inspection devices (i.e., those that provide an indication of belt wear) could be used within the scope of Applicant's invention. The statement relied upon by the Examiner in no way suggests that the contribution to the art provided by Applicant's invention is known because various types of belt condition sensing technology are known. Applicant's claimed invention is not

directed to a specific type of sensor but, instead, to a placement of the sensor within the elevator system to provide information regarding the condition of the belt.

THE REJECTION UNDER 35 U.S.C. §112, FIRST PARAGRAPH

The Examiner rejects the claims asserting that the specification does not enable one skilled in the art to practice the invention. The basis of the Examiner's rejection is stated in the Final Office Action but appears to be at least internally contradictory. The Examiner begins by saying the claimed subject matter was "not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention." Later in the same Office Action, the Examiner states that "the specification seems to imply that one of ordinary skill in the art would be able to place the sensor at the most logical position...the discussion relating to Figures 2A, 2B discuss the steps that determine a placement of the sensor in the best available position but this would appear to be knowledgeable to [one] of ordinary skill in the art or material that would be available in an installation manual."

The rejection also contains a somewhat confusing statement that does not seem to fit with the rejection in that the Examiner, when referring to the specification, states, "it cannot be seen how this would comprise a structural limitation or method step."

THE REJECTION UNDER 35 U.S.C. §112 IS IMPROPER

Not only are there internal inconsistencies in the grounds of rejection under 35 U.S.C. §112, but the Examiner fails to recognize that the specification clearly states the types of considerations that the inventive approach includes for determining the best possible location of a sensor device for monitoring the portion of a belt that is most likely to wear. Additionally, the specification provides five different sample types of elevator

systems where the principles of the inventive approach are utilized to make a determination of where the best sensor placement would be. The specification states what the best position is for each of the given examples.

Merely because the claims are not limited to any one of the particular examples given does not mean that the claims are not enabled. The specification teaches one skilled in the art the different variables that should be taken into account and provides specific examples of taking those variables into account for making a determination for the best location of a belt condition inspection device within an elevator system. This is clearly disclosed and claimed.

THE REJECTION UNDER 35 U.S.C. §103

The Examiner purports to combine *Yamazaki, et al.* with the statement from Applicants' specification that a variety of belt condition sensors could be used in a system designed according to this invention. There is no statement of where the motivation to combine arises and there is no explanation as to how the proposed combination is the same as Applicants' claimed invention.

THE REJECTION UNDER 35 U.S.C. §103 IS IMPROPER

An rejection under 35 U.S.C. §103 must begin with a legally sufficient motivation to make a proposed combination to establish a *prima facie* case of obviousness. In this case, there is no motivation to make the combination. If one were to substitute a belt condition inspection device from the art, which is all that the statement relied upon by the Examiner from Applicants' specification discloses, it would defeat the operation of the arrangement in *Yamazaki, et al.* Therefore, there is no motivation to make the combination and there is no *prima facie* case of obviousness.

Yamazaki, et al. relies upon a particular measuring apparatus that measures traveling waves within the rope responsive to an instantaneous lateral displacement applied to the belt. If one were to substitute a belt condition monitoring device such as that mentioned by Applicants, the arrangement of *Yamazaki, et al.* would no longer work. The entire intended operation of *Yamazaki, et al.* would be eliminated. There is no *prima facie* case of obviousness.

Further, even if the combination were proper, it is not the same as Applicants' claimed invention. Nowhere in the statement from Applicants' specification nor the *Yamazaki, et al.* reference is there any discussion of placing a sensor in a position in an elevator system to determine the condition of a belt at the portion of the belt that is most likely to wear. There is no discussion of taking into account various system variables to determine where to place the sensor. Moreover, there is no ability using the improper combination to obtain belt condition information as is accomplished with a system or method as claimed.

The *Yamazaki, et al.* reference is directed to an entirely different problem than what is solved by Applicants' claimed invention. No stretch of the teachings of *Yamazaki, et al.*, even if combined with the statement from Applicants' specification, results in Applicants' claimed invention.

CLAIMS 1 AND 2 ARE ALLOWABLE

Claim 1 includes "an inspection device that provides information regarding a wear condition of a portion of the rope that is most likely to wear." This claim reads on any one of the example systems shown in the drawings and described in the specification. This is

clearly taught in the specification and nowhere shown or suggested within the cited *Yamazaki, et al.* reference.

Without a *prima facie* case, claim 1 cannot be considered obvious. Even if the combination were proper, it lacks any teaching of a sensor placed in position to detect the condition of the portion of the rope that is most likely to wear.

There is no basis for the Examiner's continued refusal to allow claim 1.

CLAIM 3 IS ALLOWABLE

Claim 3 adds to the limitations of claim 1 that "the inspection device is supported to move with the [elevator] cab." Even if one were to make the Examiner's proposed substitution in the *Yamazaki, et al.* reference, which cannot be done as described above, it could not be done in a manner that is consistent with claim 3. The proposed combination does not meet the claim and defeats the operation of the *Yamazaki, et al.* arrangement. In order to make the tension measurements described by the *Yamazaki, et al.* reference, the cab cannot be moving. Therefore, the inspection device could not be supported to move with the cab to accomplish anything. Further, there would be no benefit to supporting the device for movement with the cab as, again, the *Yamazaki, et al.* reference requires that the cab be stationary for making the tension measurements in that reference.

Claim 3 is enabled by the specification. See, for example, page 7, lines 11-13.

CLAIM 4 IS ALLOWABLE

Claim 4 includes the further limitation that "the inspection device is positioned to provide information regarding the entire portion of the rope that is most likely to wear each time that the cab travels between chosen locations." This feature is also described in the specification at page 2, line 19-page 3, line 2 and page 7, lines 6-10, for example.

Claim 4 cannot be considered obvious. First, there is no *prima facie* case of obviousness. Secondly, it would be impossible to achieve the results desired by *Yamazaki, et al.* while the cab is traveling between chosen locations. Therefore, the proposed combination cannot possibly satisfy the limitations of claim 4 without completely destroying the intended operation of the *Yamazaki, et al.* teachings.

CLAIMS 5 AND 10 ARE ALLOWABLE

Claim 5 recites a method that includes determining what portion of a belt is most likely to wear, positioning an inspection device relative to the belt and gathering information regarding a wear condition of the portion of the belt that is most likely to wear as the cab moves between chosen positions. This claim is clearly supported by the specification. This claim covers that which is described for example at page 5, line 3 - page 10, line 2. There are at least five different examples in the specification where this is described.

Claim 5 cannot possibly be considered obvious because there is no *prima facie* case as described above. Further, claim 5 discusses gathering information as the cab moves between chosen positions. As mentioned above, the *Yamazaki ,et al.* arrangement requires the cab to be stationary while making tension measurements. Therefore, it is not possible to consider claim 5 obvious in view of *Yamazaki, et al.*, no matter what the Examiner would propose to combine with it.

CLAIMS 6-8 ARE ALLOWABLE

Claims 6-8 are directed to selecting various system characteristics and system variables for making the determination of which portion of the belt is most likely to wear. This is clearly described in the specification, for example, at page 5, line 3-line 18 and page 6, line 12-page 8, line 10.

Claims 6, 7 and 8 cannot be considered obvious because even if the Examiner's proposed modification to the *Yamazaki, et al.* reference were proper, it cannot possibly satisfy the limitations of claims 6-8. There is absolutely nothing in the art that describes the invention of these claims.

CLAIM 9 IS ALLOWABLE

Claim 9 includes the further limitation that the various factors considered when determining which portion of the belt is most likely to wear are weighted and at least one of the factors is provided a higher significance when considering the impact on the belt and determining which portion of the belt is most likely to wear. This is clearly described in the specification, for example at page 5, line 19-page 6, line 6.

Claim 9 cannot be considered obvious because there is no *prima facie* case of obviousness and even if the Examiner's proposed modification could be made, there is no teaching anywhere of performing the method steps of claim 9.

CLAIM 11 IS ALLOWABLE

Claim 11 includes the further step of supporting the inspection device for movement relative to other components of the elevator system. This is described in the specification, for example at page 9, line 6-page 10, line 2.

Claim 11 cannot be considered obvious. There is no possible benefit to putting an inspection device in a position for movement according to the teachings of *Yamazaki, et al.* because it requires that the inspection device be stationary on the belt and that the belt be laterally displaced while the elevator components are not moving. If one were to attempt to modify *Yamazaki, et al.* to be consistent with claim 11, the entire thrust of the *Yamazaki, et al.* reference would be lost.

CLAIM 12 IS ALLOWABLE

Claim 12 is allowable for the same reasons mentioned regarding claim 4 above.

CLAIM 13 IS ALLOWABLE

Claim 13 recites a method that includes considering at least one of five different system variables, determining what portion of the belt is most likely to wear based upon the consideration of those variables and positioning an inspection device such that the device gathers information regarding the portion of the belt that is most likely to wear. The entire detailed description is directed to such an arrangement and provides five different example elevator systems where this claimed method is utilized.

Claim 13 cannot be considered obvious because the Examiner has not established a *prima facie* case of obviousness. Further, there is no suggestion or teaching anywhere within the *Yamazaki, et al.* reference for any of the limitations of claim 13.

CLAIM 14 IS ALLOWABLE

Claim 14 adds the further steps of considering further system variables. For the same reasons that claim 13 should be allowed, claim 14 should be allowed and further because the additional limitations of claim 14 are nowhere shown in the *Yamazaki, et al.* reference.

CLAIMS 15 and 16 ARE ALLOWABLE

Claims 15 and 16 are directed to assigning a significance to the various system characteristics or system variables that are considered when determining which portion of the belt is most likely to wear. This is clearly described in the specification (see, for example, page 5, line 19-page 6, line 6).

These claims cannot be considered obvious because there is no *prima facie* case of obviousness. Further, there is no suggestion or teaching anywhere within the *Yamazaki, et al.* reference for performing any portion of the method steps recited in claim 15 or 16.

CONCLUSION

The specification provides proper enablement for all claimed subject matter. None of the claims can be considered obvious because the Examiner has failed to establish a *prima facie* case of obviousness (there is no benefit to making the proposed substitution into the *Yamazaki, et al.* reference and if the proposed substitution were made it would defeat the operation of the *Yamazaki, et al.* reference) and even if the Examiner's proposed substitution were made, the result is not the same as the claimed invention. Applicant respectfully requests that the rejections under 35 U.S.C. §112 and §103 be reversed and that all claims be allowed.

Respectfully submitted,

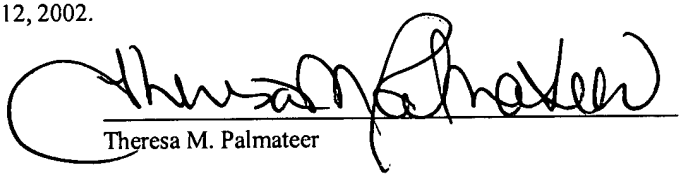
CARLSON, GASKEY & OLDS

David J. Gaskey
Registration No. 37,139
400 W. Maple, Suite 350
Birmingham, MI 48009
(248) 988-8360

Dated: July 12, 2002

CERTIFICATE OF MAILING

I hereby certify that three copies of the enclosed **Appeal Brief** is being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to Box AF, Assistant Commissioner of Patents, Washington D.C. 20231 on September 12, 2002.



Theresa M. Palmateer

APPENDIX OF CLAIMS

1. An elevator system comprising:

a cab;

at least one rope having a plurality of metallic load bearing members associated with the cab;

at least one sheave that guides the rope as the cab moves; and

an inspection device that provides information regarding a wear condition of a portion of the rope that is most likely to wear.

2. The system of Claim 1, wherein the inspection device is at a fixed point relative to the sheave.

3. The system of Claim 1, wherein the inspection device is supported to move with the cab.

4. The system of Claim 1, wherein the inspection device is positioned to provide information regarding the entire portion of the rope that is most likely to wear each time that the cab travels between chosen locations.

5. A method of inspecting at least one belt in an elevator system where the belt is associated with a cab and is guided by at least one sheave, comprising the steps of:

(A) determining a portion of the belt that is most likely to wear;

(B) positioning an inspection device relative to the belt; and

(C) gathering information regarding a wear condition of the portion of the belt that is most likely to wear as the cab moves between chosen positions.

6. The method of Claim 5, wherein step (A) includes considering at least one of a plurality of system characteristics when determining which portion of the belt is most likely to wear.

7. The method of Claim 6, wherein the system characteristics include a number of bends that the belt experiences as the cab travels between locations, dimensions of a sheave along which the belt travels, the manner in which a sheave is supported within the elevator system and an angle of belt wrap around a sheave and a worst case loading on a plurality of portions of the belt.

8. The method of Claim 7, including considering several system variables, including an elevator roping arrangement, a position of a drive mechanism, a position of the sheave and a landing at which worst case car loading conditions typically occur.

9. The method of Claim 8, including weighing the various factors and determining which of those factors has a higher significance than other factors as part of determining which portion of the belt is most likely to wear.

10. The method of Claim 5, including supporting the inspection device in a fixed location relative to the sheave.

11. The method of Claim 5, including supporting the inspection device for movement relative to other components of the elevator system.

12. The system of Claim 1, wherein the cab is supported for movement within a hoistway between an uppermost position and a lowermost position in the hoistway and wherein the inspection device is positioned relative to the rope such that the entire portion of the rope that is most likely to wear is inspected by the inspection device each time that the cab travels between the uppermost and lowermost positions.

13. A method of determining a wear condition of at least one belt in an elevator system where the belt is associated with a cab and is guided by at least one sheave, comprising the steps of:

A) considering at least one of :

a number of bends that the belt experiences as the cab travels between locations,

dimensions of a sheave along which the belt travels,

the manner in which the sheave is supported within the elevator system,

an angle of belt wrap around the sheave, and

a worst case loading on a plurality of portions of the belt;

B) determining a portion of the belt that is most likely to wear based upon the consideration from step (A); and

C) positioning an inspection device relative to the belt such that the inspection device is capable of gathering wear information regarding the portion of the belt from step (B) as the cab moves within the elevator system.

14. The method of Claim 13, including considering several system variables, including an elevator roping arrangement, a position of a drive mechanism, a position of the sheave and a landing at which worse case car loading conditions typically occur.

15. The method of Claim 14, including comparing the considered system variables and determining which of those variables has a higher significance than the other variables as part of determining which portion of the belt is most likely to wear.

16. The method of Claim 13, including assigning a significance value to that which is considered in step (A) and using the significance value as part of determining which portion of the belt is most likely to wear.